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Non-Unitary Partition Tables.

BY PROFESSOR CAYLEY.

In the theory of Seminvariants we are concerned with the non-unitary partitions of a number, that is, the number of ways of making up the number with the parts 2, 3, 4, . . . ; or what is the same writing, writing $2 = 1 - x^2$, $3 = 1 - x^3$, etc. with the Generating Functions having in their denominators the factors 2, 3, 4, etc. In the present short paper, I give the developments up to x^{100} of the functions $1 \div 2$, 2.3 , $2.3.4$, $2.3.4.5$, $2.3.4.5.6$, respectively: and also of the function $x^6 + x^{13} - 2x^{16} - x^{18} + x^{31} \div 2.3.4.5.6$, which function is (there is strong reason to believe) the G. F. for the number of sextic syzygies of a given weight: the same function without the term x^{31} occurs p. 115 in Professor Sylvester's paper "On Subinvariants, *i. e.* Seminvariants to Binary Quantics of an Unlimited Order," *A. M. J.* t. V (1882), pp. 79-136.

In the tables X is written to denote $x^6 + x^{13} - 2x^{16} - x^{18} + x^{31}$.

| Ind. x | $1 \div$ 2.3 | 2.3.4 | 2.3.4.5 | 2.3.4.5.6 | $X \div$ 2.3.4.5.6 | Ind. x | $1 \div$ 2.3 | 2.3.4 | 2.3.4.5 | 2.3.4.5.6 | $X \div$ 2.3.4.5.6 |
|----------|-----------------|-------|---------|-----------|-----------------------|----------|-----------------|-------|---------|-----------|-----------------------|
| 0 | 1 | 1 | 1 | 1 | | 50 | 9 | 65 | 258 | 750 | 186 |
| 1 | 0 | 0 | 0 | 0 | | 51 | 9 | 61 | 268 | 783 | 226 |
| 2 | 1 | 1 | 1 | 1 | | 52 | 9 | 70 | 286 | 854 | 203 |
| 3 | 1 | 1 | 1 | 1 | | 53 | 9 | 65 | 297 | 891 | 248 |
| 4 | 1 | 2 | 2 | 2 | | 54 | 10 | 75 | 316 | 972 | 223 |
| 5 | 1 | 1 | 2 | 2 | | 55 | 9 | 70 | 328 | 1010 | 270 |
| 6 | 2 | 3 | 3 | 4 | 1 | 56 | 10 | 80 | 348 | 1098 | 242 |
| 7 | 1 | 2 | 3 | 3 | 0 | 57 | 10 | 75 | 361 | 1144 | 294 |
| 8 | 2 | 4 | 5 | 6 | 1 | 58 | 10 | 85 | 382 | 1236 | 262 |
| 9 | 2 | 3 | 5 | 6 | 1 | 59 | 10 | 80 | 396 | 1287 | 319 |
| 10 | 2 | 5 | 7 | 9 | 2 | 60 | 11 | 91 | 419 | 1391 | 284 |
| 11 | 2 | 4 | 7 | 9 | 2 | 61 | 10 | 85 | 433 | 1443 | 344 |
| 12 | 3 | 7 | 10 | 14 | 4 | 62 | 11 | 96 | 457 | 1555 | 306 |
| 13 | 2 | 5 | 10 | 13 | 4 | 63 | 11 | 91 | 473 | 1617 | 371 |
| 14 | 3 | 8 | 13 | 19 | 6 | 64 | 11 | 102 | 598 | 1734 | 328 |
| 15 | 3 | 7 | 14 | 20 | 7 | 65 | 11 | 96 | 515 | 1802 | 399 |
| 16 | 3 | 10 | 17 | 26 | 8 | 66 | 12 | 108 | 541 | 1932 | 353 |
| 17 | 3 | 8 | 18 | 27 | 11 | 67 | 11 | 102 | 559 | 2002 | 427 |
| 18 | 4 | 12 | 22 | 36 | 13 | 68 | 12 | 114 | 587 | 2142 | 377 |
| 19 | 3 | 10 | 23 | 36 | 15 | 69 | 12 | 108 | 606 | 2223 | 457 |
| 20 | 4 | 14 | 28 | 47 | 17 | 70 | 12 | 120 | 635 | 2369 | 402 |
| 21 | 4 | 12 | 29 | 49 | 21 | 71 | 12 | 114 | 655 | 2457 | 490 |
| 22 | 4 | 16 | 34 | 60 | 22 | 72 | 13 | 127 | 686 | 2618 | 429 |
| 23 | 4 | 14 | 36 | 63 | 28 | 73 | 12 | 120 | 707 | 2709 | 519 |
| 24 | 5 | 19 | 42 | 78 | 29 | 74 | 13 | 133 | 739 | 2881 | 456 |
| 25 | 4 | 16 | 44 | 80 | 35 | 75 | 13 | 127 | 762 | 2985 | 552 |
| 26 | 5 | 21 | 50 | 97 | 36 | 76 | 13 | 140 | 795 | 3164 | 483 |
| 27 | 5 | 19 | 53 | 102 | 44 | 77 | 13 | 133 | 819 | 3276 | 586 |
| 28 | 5 | 24 | 60 | 120 | 43 | 78 | 14 | 147 | 854 | 3472 | 513 |
| 29 | 5 | 21 | 63 | 126 | 54 | 79 | 13 | 140 | 879 | 3588 | 620 |
| 30 | 6 | 27 | 71 | 149 | 53 | 80 | 14 | 154 | 916 | 3797 | 542 |
| 31 | 5 | 24 | 74 | 154 | 64 | 81 | 14 | 147 | 942 | 3927 | 656 |
| 32 | 6 | 30 | 83 | 180 | 62 | 82 | 14 | 161 | 980 | 4144 | 572 |
| 33 | 6 | 27 | 87 | 189 | 78 | 83 | 14 | 154 | 1008 | 4284 | 693 |
| 34 | 6 | 33 | 96 | 216 | 72 | 84 | 15 | 169 | 1048 | 4520 | 604 |
| 35 | 6 | 30 | 101 | 227 | 89 | 85 | 14 | 161 | 1077 | 4665 | 730 |
| 36 | 7 | 37 | 111 | 260 | 84 | 86 | 15 | 176 | 1118 | 4915 | 636 |
| 37 | 6 | 33 | 116 | 270 | 102 | 87 | 15 | 169 | 1149 | 5076 | 769 |
| 38 | 7 | 40 | 127 | 307 | 96 | 88 | 15 | 184 | 1192 | 5336 | 568 |
| 39 | 7 | 37 | 133 | 322 | 117 | 89 | 15 | 176 | 1224 | 5508 | 809 |
| 40 | 7 | 44 | 145 | 361 | 108 | 90 | 16 | 192 | 1269 | 5789 | 703 |
| 41 | 7 | 40 | 151 | 378 | 133 | 91 | 15 | 184 | 1302 | 5967 | 849 |
| 42 | 8 | 48 | 164 | 424 | 123 | 92 | 16 | 200 | 1349 | 6264 | 736 |
| 43 | 7 | 44 | 171 | 441 | 149 | 93 | 16 | 192 | 1384 | 6460 | 891 |
| 44 | 8 | 52 | 185 | 492 | 137 | 94 | 16 | 208 | 1432 | 6768 | 772 |
| 45 | 8 | 48 | 193 | 515 | 167 | 95 | 16 | 200 | 1469 | 6977 | 934 |
| 46 | 8 | 56 | 207 | 568 | 152 | 96 | 17 | 217 | 1519 | 7308 | 809 |
| 47 | 8 | 52 | 216 | 594 | 186 | 97 | 16 | 208 | 1557 | 7524 | 977 |
| 48 | 9 | 61 | 232 | 656 | 169 | 98 | 17 | 225 | 1609 | 7873 | 846 |
| 49 | 8 | 56 | 241 | 682 | 205 | 99 | 17 | 217 | 1649 | 8109 | 1022 |
| | | | | | | 100 | 17 | 234 | 1883 | 8651 | 883 |